Japanese Patent Application Laid-Open No. 8-220199

The feature of the present invention is the following means for:

measuring operating signals (RUN/HALT/SLOW/OFF) of a CPU (central processing unit) by each timer corresponding to the above signals to obtain each accumulated time in respective modes;

calculating the products of the accumulated time multiplied by the consumption current, which is previously provided in a table, for each mode: and then

obtaining the accumulated electric power of the whole device to display the residual electric power quantity on a display device.

The invention in our application is characterized in that a processor mode is switched by request for detaching of batteries, and is independent of the present well-known example.

Japanese Patent Application Laid-Open No. 8-54967

The present invention is characterized in that loss of diodes is prevented by switching of a discharging and charging circuit for a secondary battery using an FET (field effect transistor), instead of a diode, and the above invention has a characteristic switching method of the above control FET. However, the invention in our application is characterized in that the processor mode is switched, when the electric power may not be supplied, according to a judgement whether there is

enough electric power for the device after detaching any of batteries in parallel discharging among a plurality of batteries in simultaneous discharging. Therefore, the above invention is independent of the present well-known example.

Japanese Patent Application Laid-Open No. 5-211728

The present invention is characterized in, in a device having a plurality of batteries, that it has a unique switching method of a discharging circuit at detaching the above batteries; a reset signal is transmitted to the device, when the battery voltage is reduced lower than a threshold at switching; and a charging circuit is switched to an uncharged battery, when a battery under charging is detached.

The invention in our application is characterized in that a processor mode is switched, when the electric power is not supplied, according to judgement of whether the discharging voltage is reduced to a level at which the device may not work by increased discharging current of remained batteries in the device in the case where some of batteries in parallel discharging are detached among a plurality of batteries in simultaneous discharging. Therefore, the invention in our application is independent of the present well-known example.

Japanese Patent Application Laid-Open No. 10-12281

Articles in our application related to permission/rejection of detaching of batteries in parallel discharging at simply simultaneous discharging without

switching of processor modes are eliminated, as some of articles of claims in our application contravene articles of the claims in the present invention.

Therefore, the invention in our application is amended so that it is characterized only in switching of the processor modes by detaching of batteries in parallel discharging.

PATENT ABSTRACTS OF JAPAN

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(22)Date of filing :   19.06.1996   (72)Inventor :   TANABE HISASHI

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(54) A PLURALITY OF BATTERY CONTROL SYSTEMS

(57)Abstract:
PROBLEM TO BE SOLVED: To avoid leveling down of a system and a
loss of data during work, by supervising a residual amount of a
plurality of batteries, in the case of the battery residual amount
decreasing less than a reference when a battery is removed, locking
this battery.
SOLUTION: When power supply is performed from a battery 2A, a
battery information control device 2C acquires a residual amount of
batteries 2A, 2B periodically from a battery information transmitting
device 2D. Here, the battery 2A is removed, even only the rest of the
battery 2B is decided for whether it leads or not to a fixed reference
value. When the battery is less than the reference value, a lock signal
is fed relating to a battery lock mechanism 2Ga. When the battery is
more than the reference value, a lock release signal is fed. Also
relating to the battery 2B, similar operation is performed.
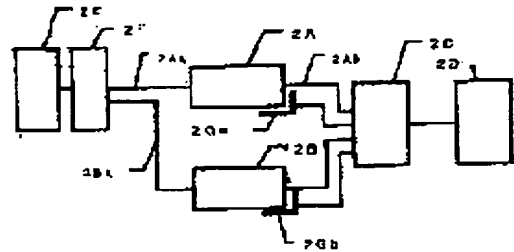
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rejection]

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rejection]

[Date of extinction of right]

(54)【発明の名称】複数バッテリ管理システム

(57)【要約】

【課題】複数のバッテリを備えることが可能な携帯型パーソナルコンピュータ等において、一つのバッテリを取り外されることによりバッテリ残量が基準値を下回り、システムダウンに陥ることがないようにする。

【解決手段】複数のバッテリと、各々のバッテリ残量を個別に管理する手段と、各々のバッテリに対して外せないようにロックをかけられるロック手段とを有し、前記複数のバッテリのうちのいずれかのバッテリが外されると残りのバッテリ残量が一定の基準値を下回る場合は、そのバッテリが外せないようにロックをかけるように複数バッテリ管理システムを構成する。

図3
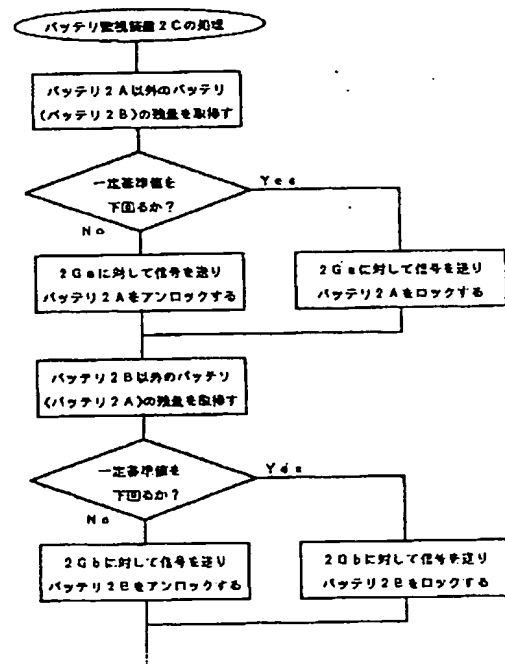
【特許請求の範囲】

【請求項１】複数のバッテリと、各々のバッテリ残量を個別に管理する手段と、各々のバッテリに対して外せないようにロックをかけられるロック手段とを有し、前記複数のバッテリのうちのいずれかのバッテリが外されると残りのバッテリ残量が一定の基準値を下回る場合は、そのバッテリが外せないようにロックをかけることを特徴とする複数バッテリ管理システム。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、複数のバッテリで駆動する携帯型パーソナルコンピュータ等の複数バッテリ管理システムに関する。

【０００２】

【従来の技術】従来の携帯型パーソナルコンピュータにおいては、例えば特開平５－８０８９２号公報や特開平６－３３８３０６号公報記載のように利用者がバッテリを誤って取り外すことがないようにロック機構を設けている。

【０００３】また、長時間の使用のために携帯型パーソナルコンピュータに複数のバッテリを備えたものがある。このような携帯型パーソナルコンピュータの複数バッテリ管理システムでは、複数のバッテリを交互に切り換えながら使用していくか、または現在使用中のバッテリ残量が一定の基準値を下回ると別のバッテリに切り換えて使用するものであった。そして、各々のバッテリの残量が一定の基準値を下回ったときにのみ警告を促すものであった。

【０００４】

【発明が解決しようとする課題】しかし上記従来技術では、複数のバッテリの合計の残量が一定の基準値を上回っているため、システム全体としては残量が足りている様に見える。そこでユーザはバッテリ交換する等の目的でバッテリを外すことができてしまい、それにより全体のバッテリ残量が基準値を下回ってしまい、システムがダウンして作業中のデータを損失してしまうという問題があった。

【０００５】本発明の目的は、かかる従来技術の問題点を解決し、バッテリを外せないようにしてシステムダウンを避けるような複数バッテリ管理システムを提供することにある。

【０００６】

【課題を解決するための手段】上記目的を達成するために、本発明の複数バッテリ管理システムは、複数のバッテリと、各々のバッテリ残量を個別に管理する手段と、各々のバッテリに対して外せないようにロックをかけられるロック手段とを有し、前記複数のバッテリのうちのいずれかのバッテリが外されると残りのバッテリ残量が一定の基準値を下回る場合は、そのバッテリが外せないようにロックをかけるように構成する。

【０００７】上記構成により、複数あるバッテリの残量を各々個別に監視し、バッテリが外されたときに残りのバッテリ残量が基準値を下回る場合にそのバッテリが外せないようにロックをかけるため、ユーザのバッテリ取り外しによるシステムダウンが避けられる。

【０００８】

【発明の実施の形態】以下、本発明の実施例を図面を参照して詳細に説明する。

【０００９】図１は、従来技術を用いた場合の携帯型パーソナルコンピュータにおける複数バッテリ管理システムの説明図である。２つのバッテリ１Ａ，１Ｂはそれぞれ１Ａa，１Ｂaから電源制御装置１Ｅに給電される。またこれらバッテリの選択は切り替えスイッチ１Ｆにより行われるもので、電源制御装置１Ｅまたはバッテリ情報伝達装置１Ｄ等からの信号により切り替え制御される。

【００１０】バッテリ情報管理装置１Ｃは、任意の時点でバッテリ情報伝達装置１Ｄに対して命令を出して１Ａb，１Ｂbを通して各バッテリ１Ａ，１Ｂの残量、残時間等の情報を取得するものである。

【００１１】またバッテリ情報伝達装置１Ｄは、独自にバッテリ情報を定期的に取得し、それが一定の基準値を下回った場合にバッテリ情報管理装置１Ｃにその情報を伝えることもある。それを受けたバッテリ情報管理装置１Ｃは、ブザーを鳴らしたり、画面に表示したり、オペレーティングシステムに通知する等の方法によりユーザに知らしめるものである。

【００１２】図２は、本発明の一実施例に係る複数バッテリ制御システムの説明図である。従来技術同様、２つのバッテリ２Ａ，２Ｂは切り替えスイッチ２Ｆにより選択されて、それぞれ２Ａa，２Ｂaから電源制御装置２Ｅに給電される。バッテリ情報伝達装置２Ｄは、任意の時点でバッテリ情報管理装置２Ｃからの命令を受けて２Ａb，２Ｂbを通して各バッテリ２Ａ，２Ｂから残量、残時間等の情報を取得して、バッテリ情報管理装置２Ｃにその情報を返す。そしてバッテリ情報伝達装置２Ｄは、バッテリ情報管理装置２Ｃから命令を受けて、本発明の特徴であるバッテリロック機構２Ｇa、２Ｇbに対して個々にバッテリのロックまたはロック解除の信号を送るものである。

【００１３】ここで、システムはバッテリ２Ａから電源供給を行っていると仮定する。バッテリ情報管理装置２Ｃはバッテリ２Ａ，２Ｂの残量をバッテリ情報伝達装置２Ｄから定期的に取得する。そこで、バッテリ２Ａが外されても残りのバッテリ２Ｂだけでも一定の基準値に達しているか判定し、もし下回っているならばバッテリロック機構２Ｇaに対してロック信号を送り、基準値を上回っているならばロック解除信号を送る。バッテリ２Ｂに対しても同様に、外されても残りのバッテリ２Ａだけでも一定の基準値に達しているか判定し、もし下回って

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いるならばバッテリロック機構２Ｇｂに対してロック信号を送り、基準値を上回っているならばロック解除信号を送る。これらの制御流れ図を図３に示す。

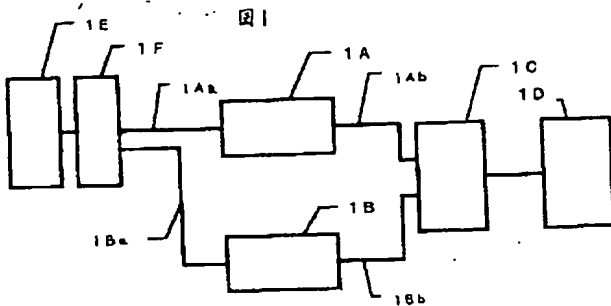【００１４】但し、システム稼働中にバッテリを充電することができない場合は、一旦基準値を下回ったら再度基準値を上回ることはないため、ロック解除信号を送る必要はない。

【００１５】またバッテリ情報伝達装置２Ｄがバッテリ情報管理装置２Ｃを介さずに、独自にバッテリ２Ａ、２Ｂの情報を定期的に取得して上述した、バッテリ外し時の残りバッテリ容量の判定を行って、バッテリロック装置２Ｇａ、２Ｇｂを制御することも可能である。

【００１６】

【発明の効果】本発明によれば、複数あるバッテリの残量を各々個別に監視し、バッテリが外されたときに残りのバッテリ残量が基準値を下回る場合には、そのバッテリが外せないようにロックをかけるため、ユーザのバッ

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テリ取り外しによるシステムダウンおよび作業中のデータの損失が避けられる。
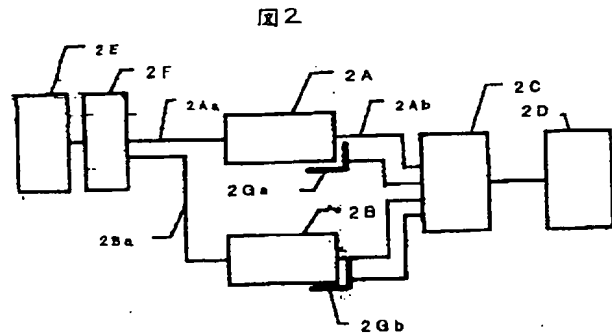
【図面の簡単な説明】

【図１】従来技術の複数バッテリ管理システム全体を示すブロック図である。

【図２】本発明の一実施例の複数バッテリ管理システム全体を示すブロック図である。

【図３】本発明の一実施例におけるバッテリ残量判定処理制御流れ図である。

【符号の説明】

１Ａ、１Ｂ…バッテリ、１Ｃ…バッテリ情報管理装置、１Ｄ…バッテリ情報伝達装置、１Ｅ…電源制御装置、１Ｆ…切り替えスイッチ、２Ａ、２Ｂ…バッテリ、２Ｃ…バッテリ情報管理装置、２Ｄ…バッテリ情報伝達装置、２Ｅ…電源制御装置、２Ｆ…切り替えスイッチ、２Ｇａ、２Ｇｂ…バッテリロック機構。

【図１】

図１

【図２】

図２

【図３】

① （バッテリ監視装置２Ｃの処理）

② バッテリ２Ａ以外のバッテリ
（バッテリ２Ｂ）の残量を取得す

③ 一定基準値を
下回るか？　　Ｙｅｓ

Ｎｏ

⑤ ２Ｇａに対して信号を送り
バッテリ２Ａをアンロックする

④ ２Ｇａに対して信号を送り
バッテリ２Ａをロックする

⑥ バッテリ２Ｂ以外のバッテリ
（バッテリ２Ａ）の残量を取得す

⑦ 一定基準値を
下回るか？　　Ｙｅｓ

Ｎｏ

⑧ ２Ｇｂに対して信号を送り
バッテリ２Ｂをアンロックする
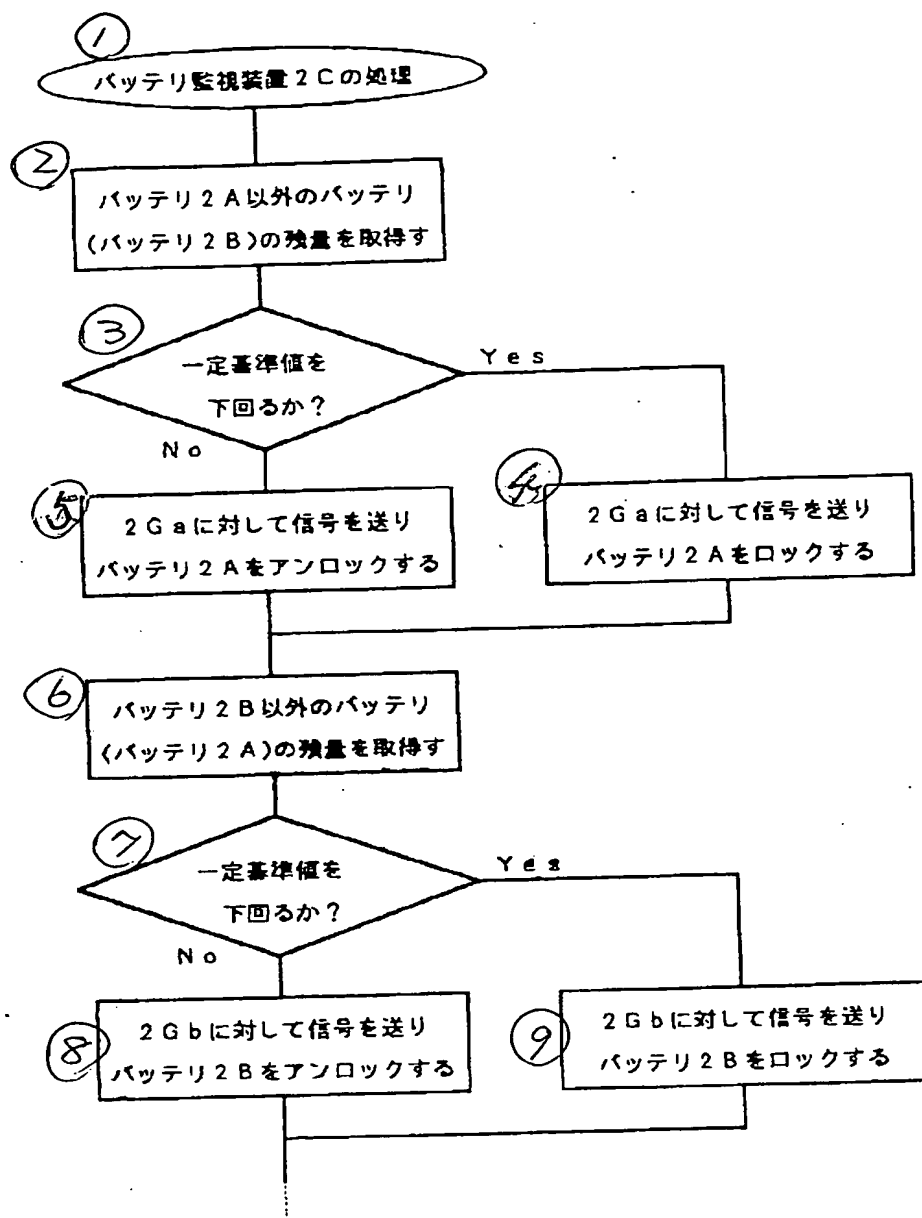
⑨ ２Ｇｂに対して信号を送り
バッテリ２Ｂをロックする

図　３

(1) 10-12281

[Title of the Invention]

CONTROL SYSTEM FOR A PLURALITY OF BATTERIES

[Abstract]

[Problem] The object is to prevent system down caused by an electric power quantity of remaining batteries under a standard level at detaching of a battery in a portable personal computer and the like with a plurality of batteries, and so on.

[Means for Solving the Problem] In order to realize the above object, the invention comprises: a plurality of batteries; a control means for individual control of residual electric quantity of each battery; and a locking means for putting each battery user lock and key against detaching. When any one of a plurality of the above batteries is detached, and an electric power quantity of remaining batteries is under a predetermined standard level, a control system for a plurality of batteries is configured to put a battery under lock and key against detaching.

[What is claimed is]

[Claim 1] A control system for a plurality of batteries comprising:

a plurality of batteries;

a control means for individual control of residual electric quantity of each battery; and

a locking means for putting each battery user lock and key against detaching, characterized in that

when any one of a plurality of the above batteries is

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detached, and an electric power quantity of remaining batteries is under a predetermined standard level, a control system for a plurality of batteries is configured to put a battery under lock and key against detaching.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] The present invention is related to a control system of a plurality of batteries of a portable personal computer driven by a plurality of batteries.

[0002]

[Prior Art] In a conventional portable personal computer, a locking mechanism has been installed in order to prevent a user from detaching of batteries by mistake, for example, as illustrated in Japanese Patent Application Laid-Open No. 5-80892, and Japanese Patent Application Laid-Open No. 6-338306.

[0003]

Moreover, there have been portable personal computers with a plurality of batteries for a long time use. In a control system of a plurality of batteries for such portable personal computers, a plurality of batteries have been used under alternately switching, or another batteries have been used by switching, when an electric power quantity of batteries under current use is under a predetermined standard level. And warning has been given only when an electric power quantity of batteries under current use is under a predetermined standard level.

[0004]

[Problems to be Solved by the Invention] However, in the above conventional technique, the residual quantity has been looked upon as enough for the whole system, as the total sum of the residual electric power quantity of a plurality of remaining batteries is over a predetermined standard level. Then, there has been a problem in which data under working are lost by system down, as a user has been able to detach a battery for exchange of batteries, and the residual electric power quantity of the whole system has been user the predetermined standard level.

[0005] The object of the present invention is to solve the above problem of the conventional technique, and to offer a control system of a plurality of batteries.

[0006]

[Means for Solving the Problem] In order to achieve the above object, a control system of a plurality of batteries of the present invention comprises: a plurality of batteries; a control means for individual control of residual electric power quantity of each battery; and a locking means for putting each battery user lock and key against detaching. When any one of a plurality of the above batteries is detached, and an electric power quantity of remaining batteries is under a predetermined standard level, the above control system is configured to put a battery under lock and key against detaching.

[0007] The above configuration may prevent system down caused by user detaching of batteries, as individual monitoring of residual electric power quantity of a plurality of batteries, and a battery is put under lock and key against detaching when

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any one of a plurality of the batteries is detached, and an electric power quantity of remaining batteries is under a predetermined standard level.

[0008]

[Embodiment of the Invention] Hereinafter, an embodiment according to the present invention will be described in detail, referring to drawings.

[0009] FIG. 1 shows an explanatory view of a control system of a plurality of batteries in a portable personal computer, which is based on a conventional technique. The voltages of two batteries 1A, 1B are supplied to a power supply control device 1E through 1Aa and 1Ba, respectively. Moreover, selection of the above batteries is performed by a changeover switch 1F, and the switching control is performed according to a signal from the power supply control device 1E or a battery information transmission device 1D and the like.

[0010] A battery information management device 1C gives instructions to the battery information transmission device 1D at any time to obtain information such as residual electric power quantity, residual electric power time and the like of each battery 1A, 1B through 1Ab, 1Bb, respectively.

[0011] And, the battery information transmission device 1D independently obtains the battery information on regular basis, and sometimes sends the information to the battery information management device 1C, when it is under a predetermined standard level. The battery information management device 1C receiving the above information lets a user know through a method such

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as sounding of a buzzer, display on a screen, and notification to the operating system.

[0012] FIG. 2 shows an explanatory view of the control system of a plurality of batteries according to one embodiment of the present invention. In a similar way to that of the conventional technique, the voltages of two batteries 2A, 2B are supplied to the power supply control device 2E, respectively, from2Aa and 2Ba by selection through the changeover switch 2F. The battery information transmission device 2D receives the instructions from the battery information management device 2C at any time, and obtains the information such as residual electric power quantity, residual electric power time, and the like of each battery 2A, 2B through 2Ab, 2Bb, respectively to return the above information to the battery information management device 2C. Then, the battery information transmission device 2D receives the instructions from the battery information management device 2C to send a signal for putting a battery under lock and key, or for unlocking the locked battery, respectively to a battery locking mechanism 2Ga, 2Gb.

[0013] Here, it is assumed that the power supply is performed from the battery 2A in the system. The battery information management device 2C obtains information on residual electric power quantities of the battery 2A, 2B from the battery information transmission device 2D on regular basis. Then, it is judged whether the residual electric power quantity of only the battery 2B is equal to or over a predetermined standard level even if the battery 2A is detached; a signal for locking the

battery is sent to the battery locking mechanism 2Ga when under the level; and one for unlocking the battery is transmitted to there when not under the level. Similarly, it is judged whether the residual electric power quantity of only the battery 2A is equal to or over the predetermined standard level even if the battery 2B is detached; a signal for locking the battery is sent to the battery locking mechanism 2Gb when under the level; and one for unlocking the battery is transmitted to there, when not under the level. The above control flow is shown in FIG. 3.

[0014] However, when it is impossible to charge batteries during operation of the system, there is no need to send the unlocking signal, as there is no case where the voltage of the battery exceeds the standard level, once it becomes under the level.

[0015] Moreover, it is also possible to control the battery locking devices 2Ga, 2Gb by the above judgement of the residual electric power of the battery at detaching of the battery, after the battery information transmission device 2D independently obtains the information on the batteries 2A, 2B, not through the battery information management device 2C.

[0016]

[Effect of the Invention] The present invention may prevent system down caused by user detaching of batteries, and loss of data under working, as individual monitoring of residual electric power quantity of a plurality of batteries, and a battery is put under lock and key against detaching when a battery is detached, and an electric power quantity of remaining

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batteries is under a predetermined standard level.

[Brief Description of the Drawings]

FIG. 1 shows a block diagram of the whole system of a control system of a plurality of batteries according to the conventional technique.

FIG. 2 shows a block diagram of the whole system of a control system of a plurality of batteries according to one embodiment of the present invention.

FIG. 3 shows a flow chart for judgement operation of residual electric power quantity of a battery according to one embodiment of the present invention.

[Description of Reference Numerals]

1A, 1B .... Battery

1C ... Battery information management device

1D ... Battery information transmission device

1E ... Power supply control device

1F ... Changeover switch

2A, 2B ... Battery

2C ... Battery information management device

2D ... Battery information transmission device

2E ... Power supply control device

2F ... Changeover switch

2Ga, 2Gb ... Battery locking mechanism

FIG. 3

① Operation of a battery monitoring device 2C

② Obtaining of information on residual electric power quantity

③ of a battery (battery 2B) other than a battery 2A

Under a predetermined standard level?

④ (Yes) Locking of the battery 2A after sending a signal to 2Ga

⑤ (No) Unlocking of the battery 2A after sending a signal to 2Ga

⑥ Obtaining of information on residual electric power quantity

of a battery (battery 2A) other than a battery 2B

⑦ Under a predetermined standard level?

⑧ (No) Unlocking of the battery 2B after sending a signal to 2Gb

⑨ (Yes) Locking of the battery 2B after sending a signal to 2Gb

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